Claim 4, line 3, after "different" insert -- independent --;

Claim 5, line 3, after "different" insert -- independent --;

Claim 6, line 2, delete "optic" and insert -- optical --;

Sub. E2 > 7. (Twice Amended) Apparatus for improving optical interactance measurements comprising:

means for providing illumination to a specimen having a characteristic to be measured [along a plurality of different paths];

means for sensing optical information developed by said illumination [provided from an] along a plurality of different independent paths through said illuminated specimen;

means, responsive to said sensed optical information, for developing a plurality of independent signals corresponding in number to said plurality of paths, said signals representing said optical information obtained from said specimen; and

means for processing said signals in accordance with appropriate modeling techniques to minimize inaccuracies in spectroscopic determination of quantitative or qualitative characteristics of the specimen.

Claim 10, line 3, delete "had" and insert -- has --;

C2 Sub E4 > 11. (Twice Amended) Apparatus for improving optical interactance[,] and transmittance [and reflectance] measurements comprising:

an elongated probe having a body portion and a tip portion, the body portion comprising a central tubular element surrounded by an annular outer element;

the tip portion having a central aperture which communicates with said central tubular element and [at least one ring] a plurality of rings which communicate with said annular outer element;

C2 the [ring or] rings in said tip portion being angled with respect to the longitudinal axis of the probe;

a number of fiber optic bundles whose number corresponds to said plurality of [ring or] rings being disposed within said outer element, each bundle being arranged at one end to exit at a respective ring and, at the other end, at least one such bundle [to be] being connected to a source of illumination; and

optical means disposed in the central tubular element for receiving optical information resulting from applied illumination to a specimen from said central aperture from different paths through a specimen and for conveying said information to a sensing device so as to develop signals representing said specimen optical information.

20. (Twice Amended) In a method of using apparatus for improving optical interactance measurements comprising means for C3 providing illumination to a specimen having a characteristic to be measured along a plurality of different paths at a probe tip of said apparatus, means for sensing optical information, at a

central aperture of said probe tip, developed by said illumination provided from an illuminated specimen, means, responsive to said sensed optical information, for developing a plurality of independent signals corresponding in number to said plurality of paths, said signals representing said optical information obtained from said specimen, and means for processing said signals in accordance with appropriate modeling techniques to minimize inaccuracies in spectroscopic determination of quantitative or qualitative characteristics of the specimen, said method including the step of arranging [the tip of the] said probe tip adjacent a specimen of small size so that reflected energy from said specimen is directed to said central aperture.

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21. In a method of using apparatus for improving optical interactance measurements comprising means for providing illumination to a specimen having a characteristic to be measured along a plurality of different paths at a probe tip of said apparatus, means for sensing optical information, at a central aperture of said probe tip, developed by said illumination provided from an illuminated specimen, means, responsive to said sensed optical information, for developing a plurality of independent signals corresponding in number to said plurality of paths, said signals representing said optical information obtained from said specimen, and means for processing said signals in accordance with appropriate modeling techniques to minimize inaccuracies in spectroscopic determination of quantitative or qualitative characteristics of the specimen [of

claim 7 or claim 11], said method including the steps of arranging [the tip of the] said probe tip adjacent a specimen of small size and using fiber optic elements to receive energy transmitted through said specimen to said central aperture.

22. (Twice Amended) In a method of using apparatus for improving optical interactance measurements comprising, means for providing illumination to a specimen having a characteristic to be measured along a plurality of different paths at a probe tip of said apparatus, means for sensing optical information, at a central aperture of said probe tip, developed by said illumination provided from an illuminated specimen, means, responsive to said sensed optical information, for developing a plurality of independent signals corresponding in number to said plurality of paths, said signals representing said optical information obtained from said specimen, and means for processing said signals in accordance with appropriate modeling techniques to minimize inaccuracies in spectroscopic determination of quantitative or qualitative characteristics of the specimen, said method including the step of providing a further source of illumination, arranging [the tip of the] said probe tip adjacent a near side of a specimen of small size, arranging the further source of illumination on a far side of said specimen, and using said probe tip so that reflected energy from said specimen is directed to said central aperture and/or energy transmitted by said further source through said specimen is directed to said central aperture.

23. (Twice Amended) In a method as in claim 22 including the step of selectively choosing an operational mode of reflectance, transmittance or combined reflectance and transmittance by selectively applying said illumination and selectively sensing reflected or transmitted illumination.

24. (Twice Amended) In a method of using apparatus for improving optical interactance measurements comprising means for providing illumination to a specimen having a characteristic to be measured along a plurality of different paths at a probe tip of said apparatus, means for sensing optical information, at a central aperture of said probe tip, developed by said illumination provided from an illuminated specimen, means, responsive to said sensed optical information, for developing a plurality of independent signals corresponding in number to said plurality of paths, said signals representing said optical information obtained from said specimen, and means for processing said signals in accordance with appropriate modeling techniques to minimize inaccuracies in spectroscopic determination of quantitative or qualitative characteristics of the specimen, said method including the steps of providing a further detector for developing an electrical signal responsive to illumination, arranging [the top of the] said probe tip adjacent the near side of a specimen of small size, arranging said further detector on a far side of said specimen, using said probe tip so that reflected energy from said specimen is directed to said central aperture

and/or energy transmittal by said probe is detected by said further detector.

25. (Twice Amended) In a method as in claim 24 including the step of selectively choosing an operational mode of reflectance, transmittance or combined reflectance and transmittance by selectively applying said illumination and selectively sensing reflected or transmitted illumination.

~~27. (Amended) In a method of using apparatus for~~ improving optical interactance[,] and transmittance [and reflectance] measurements comprising an elongated probe having a body portion and a tip portion, the body portion comprising a central tubular element surrounded by an annular outer element, the tip portion having a central aperture which communicates with said central tubular element and [at least one ring] a plurality of rings which communicate with said annular outer element, [the ring or] said rings in said tip portion being angled with respect to the longitudinal axis of the probe, a number of fiber optic bundles whose number corresponds to said [ring or] rings being disposed within said outer element, each bundle being arranged at one end to exit at a respective ring and, at the other end, at least one such bundle to be connected to a source of illumination, and optical means disposed in the central tubular element for receiving optical information resulting from applied illumination to a specimen from said central aperture from a specimen and for conveying said information to a sensing device so as to develop signals representing said specimen optical

information, said method including the step of arranging the tip of the probe adjacent a specimen of small size so that reflected energy from said specimen is directed to said central aperture.

28. (Amended) In a method of using apparatus for improving optical interactance[,] transmittance [and reflectance] measurements comprising an elongated probe having a body portion and a tip portion, the body portion comprising a central tubular element surrounded by an annular outer element, the tip portion having a central aperture which communicates with said central tubular element and [at least one ring] a plurality of rings which communicate with said annular outer element, the ring or rings in said tip portion being angled with respect to the longitudinal axis of the probe, a number of fiber optic bundles whose number corresponds to said [ring or] rings being disposed within said outer element, each bundle being arranged at one end to exit at a respective ring and, at the other end, at least one such bundle to be connected to a source of illumination, and optical means disposed in the central tubular element for receiving optical information resulting from applied illumination to a specimen from said central aperture from a specimen and for conveying said information to a sensing device so as to develop signals representing said specimen optical information, said method including the steps of arranging the tip of the probe adjacent a specimen of small size and using fiber optic elements to receive energy transmitted through said specimen to said central aperture.

29. (Amended) In a method of using apparatus for improving optical interactance[,] and transmittance [and reflectance] measurements comprising an elongated probe having a body portion and a tip portion, the body portion comprising a central tubular element surrounded by an annular outer element, the tip portion having a central aperture which communicates with said central tubular element [and at least one ring] a plurality of rings which communicate with said annular outer element, the ring or rings in said tip portion being angled with respect to the longitudinal axis of the probe, a number of fiber optic bundles whose number corresponds to said [ring or] rings being disposed within said outer element, each bundle being arranged at one end to exit at a respective ring and, at the other end, at least one such bundle to be connected to a source of illumination, and optical means disposed in the central tubular element for receiving optical information resulting from applied illumination to a specimen from said central aperture from a specimen and for conveying said information to a sensing device so as to develop signals representing said specimen optical information including the step of providing a further source of illumination, arranging the tip of the probe adjacent a near side of a specimen of small size, arranging the further source of illumination on a far side of said specimen, using said probe so that reflected energy from said specimen is directed to said central aperture and/or energy transmitted by said further source through said specimen is directed to said central aperture.

30. (Amended) In a method as in claim 29 including the step of selectively choosing an operational mode of reflectance, transmittance or combined reflectance and transmittance by selectively applying said illumination and selectively sensing reflected or transmitted illumination.

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Claim 31, line 2, after "interactance" delete " , "; delete "and reflectance";

32. (Amended) In a method as in claim 31 including the step of selectively choosing an operational mode of reflectance, transmittance or combined reflectance and transmittance by selectively sensing reflected or transmitted illumination.

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REMARKS

Applicant has amended claims 1-7, 10, 11, 20-25 and 27-32. Claims 1-15 and 17-32 are in the application.

The Examiner had rejected a number of the claims under 35 U.S.C. § 112, paragraph 2 as being indefinite. All of the claims have been revised to resolve the problems noted and each of the areas of difficulty pointed to by the Examiner have been corrected by appropriate amendment. Accordingly, it is believed that the claims do meet the requirements of 35 U.S.C. § 112, paragraph 2.

The remaining rejections were all based on rejections of the claims over the cited prior art. The Examiner initially rejected claims 1, 2, 6, 7 and 8 under 35 U.S.C. § 102(b) as being anticipated by Howarth. Reconsideration and withdrawal of